

INCH-POUND

MIL-H-26499C
10 April 1989
SUPERSEDING
MIL-H-26499B
18 July 1983

MILITARY SPECIFICATION

HOSE ASSEMBLY, METAL, FLEXIBLE, BREATHING OXYGEN

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers one type of breathing oxygen, flexible metal, hose assembly.

1.2 Specification part number. The specification part number is definitive and formatted to identify each item covered by this specification. The specification part number is formatted by selecting from the requirement options available in this specification as follows:

Definitive specification part number M 26499 - XX

M Prefix - an item defined by inch-pound (US) units _____

Specification number _____

Length (see figure 1) _____

Example: M24699-24, a hose assembly, 24 inches in length.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified (see 6.2), the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation, form a part of this specification to the extent specified herein.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: The Engineering Division, San Antonio ALC/MMEDO, Kelly AFB, Texas 78241 by using the self addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 4720

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SPECIFICATIONS

FEDERAL

- QQ-B-626 - Brass, Leaded and Nonleaded: Rod, Shapes, Forgings and Flat Products with Finished Edges (Bar and Strip).
- QQ-C-390 - Copper Alloy Castings (Including Cast Bar).
- QQ-B-654 - Brazing Alloys; Silver.
- PPP-B-60 - Boxes, Wood, Cleated-Plywood.
- PPP-B-62 - Boxes, Wood, Nailed and Lock-Corner.
- PPP-B-63 - Boxes, Shipping, Fiberboard.

MILITARY

- MIL-P-116 - Preservation, Methods of.

STANDARDS

MILITARY

- MIL-STD-12 - Abbreviations for use on Drawings, Specifications, Standards, and in Technical-Type Publications.
- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-130 - Identification Marking of U.S. Military Property.
- MIL-STD-970 - Standards and Specifications, Order of Precedence for the Selection of.

(Copies of specifications and standards required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be the issue listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the document which is current of the date of the solicitation.

COMPRESSED GAS ASSOCIATION, INC

Pamphlet V-1 American Standard Compressed Gas Cylinder Valve Outlet and Inlet Connections.

(Application for copies of CGA documents should be addressed to The Compressed Gas Association, 11 West 42nd Street, New York NY 10036.)

(Nongovernment standards and other publications are normally available from the organizations which prepares or which distributes the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall

take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification. The hose assemblies furnished under this specification shall be a product which is authorized by the qualifying activity for listing on the applicable Qualified Products List (QPL) at the time set for the opening of bids (see 4.4 and 6.3).

3.2 Components. The hose assembly shall consist of the following major components:

- a. Corrugated hose (see 3.5.1).
- b. Braided metal covering (see 3.5.2).
- c. End connections (see 3.5.3).

3.3 Selection of specifications and standards. Selection of specifications and standards for materials, parts, and Government certification and approval of processes and equipment which are not specifically designated herein and which are necessary for the execution of this specification, shall be selected in accordance with MIL-STD-970.

3.4 Materials. All parts of the hose assembly shall be made of corrosion resistant metal. No materials shall be used that are toxic or give off toxic fumes, deteriorate easily, or are otherwise adversely affected by continued use with high-pressure oxygen, or that are subject to deterioration when exposed to climatic and environmental conditions likely to occur during service usage.

3.4.1 Recycled, reclaimed, or virgin materials. Recycled or reclaimed materials shall be used to the maximum extent possible in lieu of virgin material provided that all the requirements of this specification are met and the material does not jeopardize the quality, life, or intended use of the finished product.

3.5 Design and construction. The design and construction of the hose assembly shall conform to figure 1. Nominal lengths shall be as specified (see figure 1 and 6.2).

3.5.1 Corrugated hose. The flexible pressure carrying hose shall be helically or annularly corrugated from corrosion-resistant, seamless or welded and redrawn steel tubing. The final inside diameter shall be 0.250 , $+0.063$, -0.016 inch.

3.5.2 Braided outer covering. The corrugated hose shall be reinforced with one or more layers of corrosion-resistant steel-wire braid.

3.5.3 End connections. A nipple and swivel nut in accordance with pamphlet V-1, Compressed Gas Association, connection No. 540 shall be silver soldered onto each end of the hose. The nipple shank length shall not exceed 1.500 inches. The nipple and swivel nut shall be made of material conforming to QQ-B-626, composition 22, half-hard or QQ-C-390, composition 2.

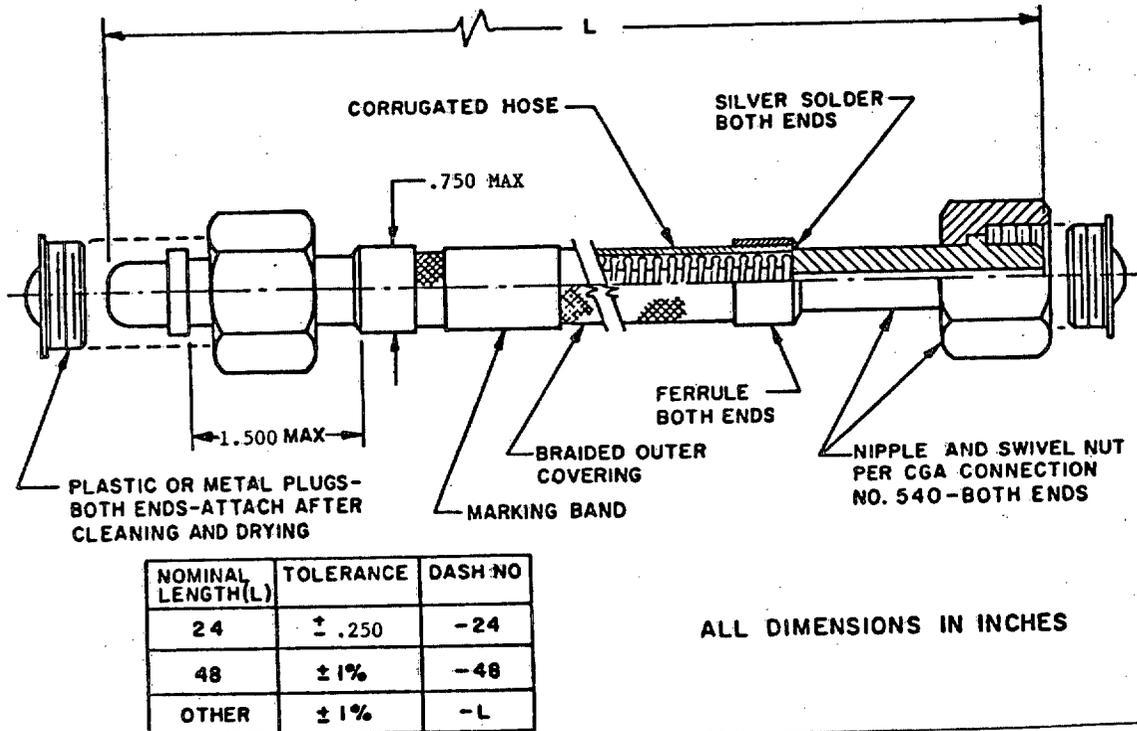


Figure 1. Design and construction.

3.5.3.1 Ferrules. A hexagonal ferrule, approximately .500 inch long and .750 inch across the flats, shall be provided at each end of the hose as shown on figure 1. When held by a wrench, the ferrule shall prevent the twisting of the hose assembly during installation.

3.5.4 Silver soldering. All silver soldering operations shall be accomplished with class 4, 5, or 6 silver solder in accordance with QQ-B-654. The ferrule, corrugated hose, braided outer covering, and nipple shank shall be silver soldered together at each end of the hose assembly as shown on figure 1.

3.6 Performance.

3.6.1 Proof pressure. The hose assembly shall be capable of withstanding a proof pressure of 7,000 pounds per square inch gage (psig) without leakage.

3.6.2 Low temperature. The hose assembly shall be capable of bending, without damage, 180° degrees around a 4-inch diameter mandrel with the hose assembly stabilized at -65° Fahrenheit (F).

3.6.3 Vibration. The hose assembly shall be capable of withstanding vibration of 3,600 cycles per minute (cpm) without sign of failure, while the hose assembly is pressurized to proof pressure of 7,000 psig.

3.6.4 Pressure impulse. The hose assembly shall be capable of withstanding 50,000 pressure impulses from 0 to 3,500 to 0 psig without failure.

3.6.5 Hose assembly tensile strength. The hose assembly shall be able to withstand a tensile pull of 1,000 pounds without failure.

3.6.6 Burst pressure. The hose assembly shall not burst or otherwise break at any seam or junction at less than 14,000 psig hydraulic pressure.

3.7 Identification of product. The hose assembly shall be marked for identification in accordance with MIL-STD-130 as specified for parts. The marking shall be made in raised or stamped lettering on a corrosion resistant metal band permanently fastened around the braided outer covering. The following special marking shall be included on the band:

"MAX WORKING PRESSURE - 3,500 PSIG"

3.8 Workmanship. The hose shall be assembled and finished with particular attention given to freedom from blemishes, defects, burrs, and sharp edges, and to thoroughness of soldering. Loose, spattered, or excess silver solder, metal chips, flux, and all other foreign material shall be removed prior to final cleaning and drying. After cleaning and drying each hose assembly shall be totally void of any trace of petroleum residue.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet the requirement of sections 3 and 5. The inspections set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirement in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to the acceptance of defective material.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. Qualification inspection (see 4.4).
- b. Quality conformance inspection (see 4.5).

4.3 Inspection conditions. The test specified in 4.6.1 shall be conducted after the hose has been cut to length, but prior to the soldering of end connections to the corrugated hose. All other tests shall be performed with the hose assembly completely assembled.

4.4 Qualification inspection.

4.4.1 Qualification inspection samples. The qualification test samples shall consist of four (4) hose assemblies. Samples shall be identified with the manufacturer's part number and any additional descriptive information required by letter of authorization.

4.4.2 Qualification required. Prior to actual procurements, the products which this specification covers shall pass the qualification inspections specified herein. If the product is later modified in any way, the modified form shall be subjected to and shall pass the same qualification tests.

4.4.3 Qualification inspection. Qualification inspections shall be performed by the manufacturer and shall consist of the tests shown in table I and in the order listed for each sample submitted.

TABLE I. Qualification inspection.

Inspection	Requirement paragraph	Test paragraph
a. Dimension inspection	3.5.1	4.6.1
b. Examination of product	3.4, 3.7, 3.8	4.6.2
c. Proof pressure	3.6.1	4.6.3
d. Low temperature	3.6.2	4.6.4
e. Vibration	3.6.3	4.6.5
f. Pressure impulse	3.6.4	4.6.6
g. Tensile strength	3.6.5	4.6.7
h. Burst pressure	3.6.6	4.6.8

4.5 Quality conformance inspection. The quality conformance inspection shall consist of the individual inspections. Each hose assembly shall be subjected to the following tests.

- a. Examination of product (see 4.6.2).
- b. Proof pressure (see 4.6.3).

- c. Tensile strength (see 4.6.7).
- d. Burst pressure (see 4.6.8).
- e. Inspection of packaging (see 4.7).

4.5.1 Noncompliance. If a sample fails to pass one or more of the qualification inspections, the manufacturer shall notify the qualifying activity and the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of the product which can be corrected and which were manufactured with essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity has been taken. After the corrective action has been taken the inspection shall be repeated on additional sample units (all tests and examinations, or the test which the original sample failed), at the option of the qualifying activity. The inspections may be reinstated for all passed inspections, however final acceptance and shipment shall be withheld until the reinspection of the failed test has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure shall be furnished to the cognizant inspection activity and the qualifying activity.

4.5.2 Shipped defective material. If the investigation of a test failure should indicate that defects exist in items already accepted. The contractor shall fully advise the procuring activity of all defects likely to be found and methods of correcting them.

4.6 Test methods.

4.6.1 Dimension inspection. The corrugated hose sample shall be inspected to determine if the hose inside diameter is 0.250 , $+0.063$, -0.016 inch. A corrugated hose sample not within this tolerance shall be cause for rejection of the lot.

4.6.2 Examination of product. The hose assembly shall be inspected to determine compliance with the requirements specified herein with respect to materials, workmanship, and marking. The hose overall length shall be checked against figure 1 as applicable to the nominal length specified (see 6.2).

4.6.3 Proof pressure test. The hose assembly shall be subjected to a hydrostatic pressure of $7,000$ psig for a minimum of 3 and a maximum of 10 minutes. Clean water shall be used as the pressurizing fluid. Evidence of leakage from any part of the hose assembly shall be cause for rejection. Except for hose assemblies selected for the sampling tests or qualification test, satisfactory hose assemblies shall be cleaned, dried, and plugged in accordance with 5.1.1.1 after completion of the proof pressure test.

4.6.4 Low temperature test. The hose assembly shall be brought to a stabilized temperature of -65° F. While at -65° F, the hose assembly shall be grasped by the end connections and bent 180 degrees around a 4-inch diameter mandrel, after which the hose assembly shall be inspected for cracks or breaks in any component or junction.

4.6.5 Vibration. The hose assembly shall be subjected to a vibration of 3,600 cpm while pressurized to 7,000 psig. One end of the assembly shall be connected to a fixed object and the other end shall be connected to a moving object having a double amplitude of vibration of at least .125 inch. The end connected to the moving object shall be so mounted that the central axis of the hose end is parallel to the direction of vibration. The hose assembly shall be bent 180 degrees during the entire test and shall be vibrated for at least 4 hours. Any sign of leakage or cracking shall be cause for rejection.

4.6.6 Pressure impulse test. The hose assembly shall be subjected to a pressure impulse cycle from 0 to 3,500 to 0 psig at the rate of approximately 1 cycle per second (cps) for 50,000 impulse cycles. The hose assembly shall be bent 180 degrees during the entire test. Any sign of leakage or cracking shall be cause for rejection.

4.6.7 Tensile strength test. The hose assembly shall be attached by the end connections to the heads of a tensile testing machine and pulled at the rate of approximately 1 inch per minute up to 1,000 pounds pull. Any failure below 1,000 pounds shall be cause for rejection of the lot.

4.6.8 Burst pressure test. The hose assembly shall be hydraulically pressurized from 0 to 14,000 psig in approximately 2 minutes. If any component of the hose assembly bursts or the assembly cracks at any junction, the lot shall be rejected.

4.7 Inspection of packaging. Except when industrial packaging is specified, the sampling and inspection of the preservation and interior package marking shall be in accordance with groups A and B quality conformance requirements of MIL-P-116. The sampling and inspection of the packing and marking for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification shown in section 5 and the marking requirements of MIL-STD-129. The inspection of industrial packaging shall be as specified in the contract or purchase order (see 6.2).

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with Level A or C as specified (see 6.2.c).

5.1.1 Level A. Hose assemblies shall be cleaned, preserved, and packaged as follows:

5.1.1.1 Cleaning. Each hose assembly shall be cleaned of all dirt, flux, and foreign matter by flushing with a suitable solvent. All traces of the solvent shall be removed by flushing the hose assembly with a hot inhibited alkaline cleaner, then rinsing with clean water. The hose assembly shall be thoroughly dried by water-pumped air or nitrogen. The ends of the hose assemblies shall then be sealed with noncombustible, noncorrosive, and nonshredding plastic plugs.

5.1.1.2 Unit packaging. Each hose assembly shall be unit protected without a preservative in accordance with submethod 1c-1 of MIL-P-116.

5.1.1.3 Intermediate packaging. Hose assemblies unit packaged as specified in 5.1.1.2 shall be intermediate packaged in class weather-resistant containers conforming to PPP-B-636. Hose assemblies 48 inches or less shall be packaged straight in quantities of 25 each. Hose assemblies over 48 inches shall be packaged in quantities of 10 each. Intermediate packaging is not required when the quantity of hose assemblies to a single destination is less than the quantity required for one intermediate container.

5.1.2 Level C. Hose assemblies shall be accorded the minimum preservation and packaging required to insure against deterioration, damage, or contamination from foreign matter during shipment to the initial receiving activity. Methods and materials shall be in accordance with carrier rules and regulations.

5.2 Packing. Packing shall be level A, B, or C as specified (see 6.2).

5.2.1 Level A. Hose assemblies, packaged as specified in 5.1, shall be over-packed in a close-fitting box conforming to PPP-B-601, overseas type, Grade B, style optional or a PPP-B-621, Class 2, style optional. The boxes shall be closed and strapped in accordance with the appendix of the box specification.

5.2.2 Level B. Hose assemblies, packaged as specified in 5.1, shall be over-packed in a close-fitting box conforming to PPP-B-636, class weather-resistant or as specified for level A except that the boxes may be domestic type. Closure and strapping shall be in accordance with the box specification.

5.2.3 Level C. Hose assemblies, packaged as specified in 5.1, shall be over-packed in containers in a manner that will insure safe delivery to destination and meet carrier rules and regulations.

5.3 Marking for shipment and storage. Unit and intermediate packages and exterior shipping containers shall be marked in accordance with MIL-STD-129. The nomenclature shall be:

Hose Assembly, Metal, Flexible, Breathing Oxygen, High Pressure

6. NOTES

6.1 Intended use. The hose assemblies covered by this specification are intended for use as flexible manifolding connections on oxygen ground servicing equipment.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Specification part number identifying nominal lengths of hose assemblies required, according to dash numbers shown on figure 1 (see 3.5).
- c. Levels of preservation and packaging, and packing (see Section 5).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified Products List ((QPL-26499) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is: San Antonio Air Logistics Center, Engineering Division, ATTN: MMEDO, Kelly AFB, TX 78241, and information pertaining to the qualification of products may be obtained from that activity.

6.4 Subject term (key word) listing.

hose assembly, oxygen, ground servicing
oxygen, breathing, hose assembly

6.5 Changes from previous issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodian:

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(Project 4720-F043)

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